SCIENCE

FRIDAY, JULY 7, 1911

CONTENTS

MSS. intended for publication and books, etc., intended for review should be sent to the Editor of SCIENCE, Garrison-on-Hudson, N. Y.

THE GENESIS OF THE ATTENTION IN THE EDUCATIVE PROCESS[1]

EDUCATION is suffering from a sort of dual personality. Its psychology and practise move along in more or less parallel lines without the one greatly interfering with the other. Evidence that interest, when it exists, must always follow attention to the idea or group of ideas which called it out, does not deter the enthusiastic teacher from giving this interest an external source instead of ascribing it to the mind.

Attention results from the mind's acquiescence in the focal presence of a particular idea or group of ideas. This is true whether the attention be of the so-called passive or active variety, since the only difference between the two lies in the complexity of the latter. In "voluntary" attention, more than one attraction is offered, and, each presenting inducements, the mind receives the one with more or less consciousness of what it has lost in giving up the other. This consciousness of deprivation, together with certain muscular sensations, probably makes up the feeling of effort which has caused this form of attention to be popularly thought active. Attention means a certain arrangement of the content of consciousness, which gives clearness to one idea or group of ideas, and produces comparative, though not equal, obscurity of the others. Change of attention requires a redistribution of the content, and this is accompanied by a re-

[1] Read before the joint meeting of the American Psychological Association and Section L—Education; American Association for the Advancement of Science, Minneapolis, December, 1910.

arrangement of clearness. The change may be partial or complete, depending upon the operating causes and upon the condition of the mind.

The educational problem is to secure attention for certain ideas which make for growth, and the difficulty in solving this problem is that these ideas, intended, as they are, to prepare children for the future rather than the present, are likely to represent types of experience beyond the children's stage of development. One can not avoid a certain sympathy with the eleven-year old girl who refused to try to find how many times a bucket must be filled to empty a circular well, the height and bottom radius of which were given, together with the height and radii of the bucket, on the ground that no one but a fool would try to empty a well in that way. To give attention to ideas whose value is a future asset requires rejection of those of present significance, and the mind refuses to make this sacrifice unless convinced of a more deserving claim. This is the reason for our unwillingness to listen to a friend when we are hurrying to a train.

If active attention differs from passive in the number of applicants for the limited accommodations in the focus of consciousness, the very practical question arises concerning the part the educator may play in this contest. It looks as though he enters the competition so heavily handicapped as hardly to be able to show his wares.

The feelings have been thought to be the strategic base of operations from which a successful flanking movement could be started. The innumerable and disorderly mental processes of youngsters could then, it was believed, be driven into a narrower line of march, and finally, as they became more restricted, be compelled, in sheer self-defense, to give heed to the interesting ideas which the skillful teachers always put at the head of their attacking column.

Unfortunately, however, for this theory, a little observation shows how unreliable are the feelings after we have marshalled our forces for the attack. A college student recently told the writer that, after an eloquent exposition by his professor of English history of the period of George III., it was mentioned, as an instance of that monarch's abstemiousness, that he always had boiled mutton and turnips for dinner. Now, if there are any articles of diet which this student abhors, it is boiled mutton and turnips. Consequently, all the deserving ideas related to the period of George III. were forced to yield, for the time, to the domination of turnips and mutton, and when, the following year, George III. was reached in American history, all other ideas were driven from the consciousness of this young man while he breathlessly waited again for mutton and turnips. Evidently the feelings are an unsafe educational guide, if hateful objects and ideas may be as attractive as those which are pleasant.

Again, rewards and penalties have seemed to some to be the effective means of winning the attention. The first fails on account of uncertainties regarding the sort of knowledge which will secure the reward, and the second is unproductive because the teacher and the implied punishment are too prominent in the consciousness of the learner for efficient concentration. Further, both of these incentives divide the attention. The prerequisite of a productive state of consciousness is that all diverting ideas and objects, including the teacher himself, pass out of consciousness and leave the field free for the competitive interaction of the mental processes created by the work in hand. Ideas may be forced upon children while the native impulses are restrained by penalties, much as one may be compelled to eat what does not suit his taste, but the mind refuses to

react just as gastric juice is stingy of its flow when food is unattractive. Whether, in this apparently unequal contest with native impulses, educative ideas may be aided in other ways than by relieving the mind of what may be called the school consciousness, and by giving it freedom of action, remains to be discussed.

The growing point in elementary and secondary education is the special schools for delinquents, and reformative institutions. The reason for this is that the boys in these schools are so much the primitive man that the traditional plan of education breaks down completely when applied to them. On this account, the experimental method, which until recently was regarded as so heretical as to justify the excommunication of its advocates from the communion of righteous pedagogues, was forced upon those in charge. The result is that delinquents have the best schools. And they secured them by refusing to submit to the traditional method.

Not the least curious thing about these disciplinary schools is that they require less discipline than the ordinary school. Of course, a dose of disciplinary medicine is sometimes necessary at the beginning. It has much the same value as that which David Harum attributed to fleas on a dog. Too sudden a break with one's past is likely to prove disastrous.

It should be remembered that disciplinary schools and reformative institutions deal with youngsters who can not be controlled in the ordinary school. To be able, under these circumstances, to produce in the majority of the boys a condition of consciousness attentive to study, and to develop a mental attitude responsive to social incentives is certainly remarkable. Instances of unusual influence have been often noticed, but the success is generally explained by the vague term personality. The method of these teachers, however, is strikingly similar. They secure attention to their ideas by identifying them with the racial instincts characteristic of boys.

Efficiency in education reduces itself largely to the attitude of the learner toward instruction. In the more mature, many derived interests cluster around desire for success, but in children these control elements only occasionally exist. With them, the problem is to capture a purposeless, wayward attention often enough, and to hold it long enough, to impress the mind with the significance of a few derived interests which may serve as a new base of operations from which to push on to further development. One's attitude toward knowledge depends upon the mental content. The ideas and activities of children are the stuff out of which their thoughts are made. In early life, this material is social, and it is social because it is racial.

The force of this social instinct is seen in the number of clubs formed by boys without the assistance of adults. Sheldon found[2] that seventy-two societies were represented among one hundred and seventeen boys of eight and nine years of age, and six hundred and twenty-five societies among seven hundred and forty-eight boys from ten to thirteen, inclusive. This investigation included three New England cities and two on the Pacific coast. Clearly, the social instinct is a tremendous educational force.

Johnson says[3] that the children in his vacation school preferred "to submit to a flogging as evidence that they sincerely intended to resist temptation" to disobey, "rather than to stay away from school." "Nearly every species of butterfly to be found in Andover, Mass., during the sea-

[2] *American Journal of Psychology*, Vol. 9, p. 425.

[3] *Pedagogical Seminary*, Vol. 6, p. 516.

son was captured'' by his children. Many kinds of caterpillars were watched as they developed into chrysalides in the cages, and nearly all the different kinds of fishes to be found in the streams and ponds were caught and studied. Much of this work was done outside of school hours. What enthusiasm is this for securing attention to knowledge in almost every subject of the curriculum!

A child has many possibilities, only one of which reveals itself under a given set of conditions. The self is not one and unchangeable, though it acts as a unit in a particular situation. The group offers a diversity of ideas, and the one selected is less individually selfish in proportion as it partakes of the group spirit. Children are intolerant of personal self seekers, and the group sentiment dominates partly because of its larger, more universal worth. It meets the needs of individuals through its adaptiveness to the wants of the entire group. What the group decides is for its good the individual accepts. In this way the group sentiment directs and rules the attention of those who contribute to its spirit.

Children are rarely inattentive to work which they regard as their own. The group sentiment is always active in determining what ideas shall occupy the focus of consciousness. To remain members of the group, boys must attend to business. Making children feel that the work is theirs and not the teacher's means, then, securing the attention. But this can only be done by utilizing the racial instincts in the educative process. This, the schools have failed to do and, as a result, teachers are continually working against the resistance of the group consciousness. The school is divided into two camps, the one, the teacher, trying to win attention by creating factitious interests, and the other, the children, momentarily attracted by these devices but always watchful of a chance to assert their social selves.

The productive efficiency of the energy released by group sentiment is seen in the results accomplished under the name of play. It is not the nature of the activity that distinguishes work from play, so much as the mental attitude assumed toward the occupation. The same subjects of study are tedious under the ordinary class method and interesting when made the order of business in a club of the members of the class, of which the teacher is an integral but inconspicuous part. The club idea appeals to the racial instincts of love of glory—showing off—and personal competition, both of which are elements in the group sentiment. There is no lack of attention here.

The utilization of the racial instincts in securing attention to educative ideas has been resisted by school-men largely because of the educational dogma of effort. Effort has been greatly overworked of late. Attention does its best work when the feeling of effort is wanting. Effort indicates resistance or strain, and accompanies inefficient attention. As we become proficient in our work, it decreases and, finally, disappears completely. The reverence for effort has arisen in the misapprehension of the relation of feelings to attention, and in the belief that strain has some occult pedagogical value. That which is pleasant is not for that reason easy, nor is the difficult necessarily unpleasant. It is intensity of thought which counts in mental development. The feeling of effort adds no value to the educative process. Consciousness of strain indicates imperfect attention with undue prominence of muscular sensations, or friction. The friction may be caused by the novelty of the ideas, by bodily discomfort, or by temporary mental incon-

gruity, as when one has heard bad news. If the incongruity is permanent, because of lack of ability to give the ideas an orderly arrangement, their educative value is at least doubtful.

Attention is determined by past and present states of consciousness. In childhood, these states of consciousness are largely racial and social, and continued attention can be secured only by creating educational situations in which the school consciousness loses its identity in the racial and social consciousness.

EDGAR JAMES SWIFT

WASHINGTON UNIVERSITY,
ST. LOUIS, MO.

THE CHEMISTS' CLUB[1]

I HAD the honor, I believe, of presiding over the first meeting of the New York Section of the American Chemical Society held in the Assembly Hall of what subsequently became the quarters of the Chemists' Club, and I feel honored in being invited to address the last meeting held in those quarters. At that first meeting expression was given to hopes which to some, at that time, seemed extravagant, but which have now been splendidly realized.

It will not be out of place nor without interest, I am sure, to briefly recall some of the facts and influences which led to the ultimate organization of the Chemists' Club—a club which has, for more than a decade, had such a potent influence in centralizing the interests of the chemists of New York and the vicinity, and has furnished a home for these chemists and their several societies and associations.

At the meeting of the American Association for the Advancement of Science, held in Boston in 1898, the question of the disposal of the books and other material constituting the library of the association was discussed. It was decided to consign this material to the University of Cincinnati. In the meeting of the council of the American Chemical Society held at about the same time and in the same place, inquiry was made concerning the location and condition of the books and material constituting the library of the American Chemical Society. After the closing of the old university building on Washington Square, which had housed the library for several years, all of the material had been packed in boxes and placed in fire-proof storage, where it was entirely inaccessible for consultation and use. On my return trip to New York after the close of that meeting I was accompanied by Dr. Charles F. McKenna. Our conversation naturally turned upon the material constituting the library of the society, regarding the disposition of which no decision has been made. This library was known to contain much valuable chemical material not otherwise available in this country, and it was evident that its removal from the city would be a misfortune to the local chemists. In the course of our conversation, Dr. McKenna suggested that, with the retention of the library in this city as an incentive, it should be possible to arouse sufficient interest in the matter of organizing a chemists' club to make such an enterprise an established fact.

In the year or two preceding, Professor A. A. Breneman had endeavored to arouse interest in such a project, but with no special end in view, such as the retention of the library, the effort proved ineffectual. The results were, nevertheless, influential in promoting the ultimate organization of the club as we know it.

Soon after our return from Boston, Dr. McKenna called me by telephone to tell me he believed that the inexpensive but

[1] Address before the New York Section of the American Chemical Society on March 10.